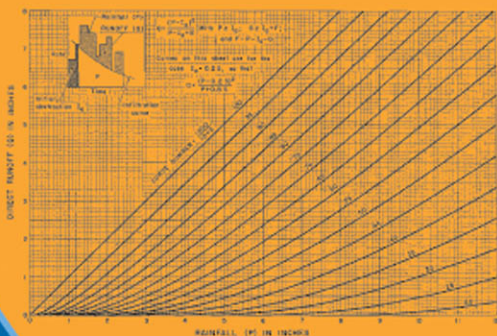




Curve Number Hydrology

State of the Practice

Richard H. Hawkins
Timothy J. Ward
Donald E. Woodward

ASCE

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CURVE NUMBER HYDROLOGY

STATE OF THE PRACTICE

PREPARED BY
The ASCE/EWRI Curve Number Hydrology Task Committee

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Preface

“Art is the lie that enables us to realize the truth.”

—Picasso

Acknowledgments

This report has benefitted from numerous individuals during its development. The Curve Number Hydrology Task Committee membership has varied since its creation, but early membership included (in addition to the authors of the report) Richard H. Berich, Allen Hjelmfelt, Jr., Richard H. McCuen, Norman Miller, Jit Pagano, Victor Miguel Ponce, Kenneth G. Renard, and Zhida Song-James. Several of these individuals represented the Surface Water Technical Committee and/or the Watershed Management Technical Committee of the EWRI/ASCE.

The authors acknowledge the many contributions that were freely given, and the significant roles by the following, in generating this report, and to a larger extent to the ongoing creation and evolution of the Curve Number “method” itself: James V. Bonta, Cheng-lung Chen, Mark M. Dripchak, Allen T. Hjelmfelt, Jr, Rollin H. Hotchkiss, Ruiyun Jiang, Paul A. Lawrence, Richard H. McCuen, S.K. Mishra, Victor Miguel Ponce, Robert E. Rallison, Kenneth G. Renard, P. DeAnne Rietz, J. Marvin Rosa, Roland Schulze, J. Roger Simanton, Maria J. Simas, Vijay P. Singh, Ghassem Sobhani, Everett P. Springer, and Kevin E. VerWeire. The authors also wish to thank James V. Bonta, Paul DeBarry, Allen T. Hjelmfelt, Jr., Claudia Hoeft, Rollin H. Hotchkiss, Richard H. McCuen, and Kenneth G. Renard for their reviews of an early draft of this report. Their time and critical comments are greatly appreciated.

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Very special recognition must go posthumously to Victor Mockus (August 8, 1913–May 22, 1997). While generally unappreciated in the applied hydrology community, it was his creative genius that brought the Curve Number method together from the different components.

Limitations and Apologies

Given the finite time, energy, and intellectual resources available for this work, the viewpoint and reporting here is unavoidably slanted to North American experiences and use. Recent years have seen an explosion of Curve Number (CN) applications

and technical papers. Much of this mushrooming has been contemporary with the creation of this report, and universal up-to-date coverage is simply not possible.

International adaptation of the CN method has grown. An admirable CN subculture has evolved in India under the leaderships of S.K. Mishra and V.P. Singh and many co-workers. A similar well-developed technology has evolved in South Africa pioneered by Professor Roland E. Schulze. Although these were originally incubated in the USA, they have been further developed to meet specific user needs and technical expectations in their own social and technical environments. While only limited technical coverage is given to the international CN community in this report, the ongoing efforts and contributions are worthy of note.

The CN procedure is no longer a simple American agency method. Examples of interest, participation, in and adaptation to other international settings are provided by Boughton (1989) [Australia]; Reich (1962) [South Africa]; Ghile (2004) [Eritria]; Colombo and Sarfatti (2005?) [Italy and Eritrea]; Gebremeskel et al. (2005), and Perrone and Matramootoo (1998) [Canada]; Ignar et al. (1995), Ignar (1988, 1993), Banasik *et al* (1994) [Poland]; Kuntner(2002) [Switzerland]; Sobhani (1976)[Iran]; Al-Udani (1984) [Yemen]; Michel et al. (2005) [France]; Ponce et al.(2005) [Mexico]; Sartori et al. (2004) [Brazil]; Wang et al. (2006) [China]; Auersald and Haider(1996), Zaiss (1989), and Sartor (1996) [Germany]; Choi et al. (2002) [South Korea]; and Calvo et al. (2006) [Panama]. These examples are by no means exhaustive.

Much of the international interest is prompted by the wide array of associated agricultural and water quality models which have incorporated elements of the CN method for runoff generation and soil moisture management. These models seem to have achieved a life and user group of their own, and the CN components are used as a fixed background technology. This too is treated only in a recognition mode in this report. Investigations in this area do contribute markedly to the growing application of the procedure internationally, however.

With this as a background, the authors regret any misinterpretations, or any omissions of significant contributions: and such are by innocence or natural ignorance, and not by intent.

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Donald E. Woodward
Joseph A. Van Mullem

February 2008

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